

Design and Simulation of a Multistages Common-Emitter, Common-Collector, AC Voltage Amplifier

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Abstract	<p>The main function of the amplifier is to increase the signal strength, in terms of its voltage or current. In this research, a multistages ac voltage common-emitter amplifier and common-collector amplifier with a single supply of +15 V was designed. The objective is to design an amplifier for amplifying a small ac signal from a transducer. The transducer has an output impedance of 10 k. The amplifier will have a small-signal gain in order of about 1500 and a small-signal bandwidth ranging from 100 Hz to 20 kHz. It will drive a load of 300 Ω. The entire circuit consists of a first stage common-emitter configuration gain amplifier, another second stage common-emitter configuration gain amplifier, and a third stage buffer unity gain common collector amplifier. The three-stages was capacitor coupled. The overall gain of the entire amplifier is the product of the first-stage gain, the second-stage gain, and the third-stage gain. A method called short-circuit time constants was used to determine the appropriate coupling and bypass capacitors. The overall circuit was then simulated by using NI Multisim. The magnitude of the overall gain of the circuit was obtained by performing an interactive analysis and simulation. The frequency response of the amplifier was obtained by performing an AC sweep analyses and simulation. It can be showed that the amplifier's overall gain obtained from simulation is in agreement with the calculated results. The simulated result for the frequency responses were also in agreement with the requirement</p>
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